CLAIMS:

1. A control apparatus of an electric power steering apparatus comprising:

a motor applying a steering assist force to a steering system of a vehicle; and

a current command value calculating means for calculating a q-axis current command value Iqref controlling an output torque of the motor and a d-axis current command value Idref controlling a magnetic field of the motor,

wherein the control apparatus is provided with a current command value correcting means for calculating a corrected q-axis current command value Iqc obtained by correcting the q-axis current command value Iqref on the basis of a rotor position $\theta$ of the motor, and controls the motor on the basis of the corrected q-axis current command value Iqc.

2. A control apparatus of an electric power steering apparatus as claimed in claim 1, wherein the current command value correcting means calculates the corrected q-axis current command value Iqc obtained by correcting the q-axis current command value Iqref on the basis of the rotor position $\theta$ of the motor and an angular velocity $\omega$ of the rotor.

3. A control apparatus of an electric power steering apparatus as claimed in claim 1, wherein the current command value

correcting means calculates the corrected q-axis current command value Iqc obtained by correcting the q-axis current command value Iqref on the basis of the rotor position $\theta$ of the motor and the q-axis current value Iqref.

4. A control apparatus of an electric power steering apparatus as claimed in claim 1, wherein the current command value correcting means calculates the corrected q-axis current command value Iqc by adding a basic correcting current Ic previously determined by the rotor position $\theta$ to the q-axis current command value Iqref.

5. A control apparatus of an electric power steering apparatus as claimed in claim 2, wherein the current command value correcting means calculates the corrected q-axis current command value Iqc by adding a compensated current value (Kw·Kd·Ic) obtained by multiplying a basic correcting current Ic previously determined by the rotor position $\theta$ by a coefficient Kw determined by the angular velocity $\omega$ of the rotor to the q-axis current command value Iqref.

6. A control apparatus of an electric power steering apparatus as claimed in claim 3, wherein the current command value correcting means calculates the corrected q-axis current command value Iqc by adding a compensated current value (Kq·Kd·Ic) obtained by multiplying a basic correcting current Ic previously

determined by the rotor position θ by a coefficient Kq determined by the q-axis current command value Iqref to the q-axis current command value Iqref.

7. A control apparatus of an electric power steering apparatus as claimed in claim 1, wherein the current command value correcting means is constituted by a basic correcting current calculating means outputting a basic correcting current Ic previously determined by the rotor position θ, an encoding means determining and outputting a code of the q-axis current command value Iqref, and a first multiplying portion multiplying the basic correcting current Ic by a signal from the encoding means and adding to the q-axis current command value Iqref.

8. A control apparatus of an electric power steering apparatus as claimed in claim 7, wherein the control apparatus is provided with a coefficient calculating means calculating a coefficient Kw on the basis of the angular velocity $\omega$ of the rotor, and a second multiplying portion multiplying the basic correcting current Ic by the coefficient K$\omega$, and inputs an output (K$\omega$ ·Ic) of the second multiplying portion to the first multiplying portion.

9. A control apparatus of an electric power steering apparatus as claimed in claim 7 or 8, wherein the control apparatus is provided with a spark advance portion advancing the angular

velocity $\omega$, and an adding means adding an angular velocity advanced by the spark advance portion to the rotor position $\theta$, and inputs an output of the adding means to the basic correcting current calculating means.

10. A control apparatus of an electric power steering apparatus comprising:

a motor applying a steering assist force to a steering system of a vehicle; and

a current command value calculating means for calculating a q-axis current command value Iqref controlling an output torque of the motor and a d-axis current command value Idref controlling a magnetic field of the motor,

wherein the control apparatus is provided with a current command value correcting means for calculating a corrected q-axis current command value Iqc obtained by correcting the q-axis current command value Iqref on the basis of a rotor position $\theta$ of the motor and the d-axis current command value Idref, and controls the motor on the basis of the corrected q-axis current command value Iqc.

11. A control apparatus of an electric power steering apparatus as claimed in claim 10, wherein the current command value correcting means calculates the corrected q-axis current command value Iqc obtained by correcting the q-axis current command value Iqref on the basis of the rotor position $\theta$ of the motor, the

d-axis current command value Idref and an angular velocity $\omega$ of the rotor.

12. A control apparatus of an electric power steering apparatus as claimed in claim 10, wherein the current command value correcting means calculates the corrected q-axis current command value Iqc obtained by correcting the q-axis current command value Iqref on the basis of the rotor position $\theta$ of the motor, the d-axis current command value Idref and the q-axis current value Iqref.

13. A control apparatus of an electric power steering apparatus as claimed in claim 10, wherein the current command value correcting means calculates the corrected q-axis current command value Iqc by adding a compensating current value (Kd·Ic) obtained by multiplying a basic correcting current Ic previously determined by the rotor position $\theta$ by a coefficient Kd determined by the d-axis current command value Idref to the q-axis current command value Iqref.

14. A control apparatus of an electric power steering apparatus as claimed in claim 11, wherein the current command value correcting means calculates the corrected q-axis current command value Iqc by adding a compensated current value (Kw·Kd·Ic) obtained by multiplying a compensating current value (Kd·Ic) obtained by multiplying a basic correcting current Ic previously

determined by the rotor position θ by a coefficient Kd previously determined by the d-axis current command value Idref, by a coefficient Kw determined by the angular velocity ω of the rotor to the q-axis current command value Iqref.

15. A control apparatus of an electric power steering apparatus as claimed in claim 12, wherein the current command value correcting means calculates the corrected q-axis current command value Iqc by adding a compensated current value (Kq·Kd·Ic) obtained by multiplying a compensating current value (Kd·Ic) obtained by multiplying a basic correcting current Ic previously determined by the rotor position θ by a coefficient Kd determined by the d-axis current command value Idref, by a coefficient Kq determined by the q-axis current command value Iqref to the q-axis current command value Iqref.

Abstract of the Disclosure

The present invention provides a control apparatus of a electric power steering apparatus which can suppress a vibration and a noise of a motor caused by a torque ripple which is generated at a tie of applying a field-weakening control to the motor or on the basis of a motor circulating current. Accordingly, the control apparatus actually measures a relation between a basic correcting current and a rotor position which can suppress the torque ripple generated at a time of applying the field-weakening control or the torque ripple based on the motor circulating current, previously, and adds a correcting current which is regulated by taking into consideration a magnitude of a weak field current of a correcting current, a magnitude of an angular velocity of the rotor or an electrical angle of the circulating current with respect to the basic correcting current, to an original current command value.